Missouri Botanical Garden
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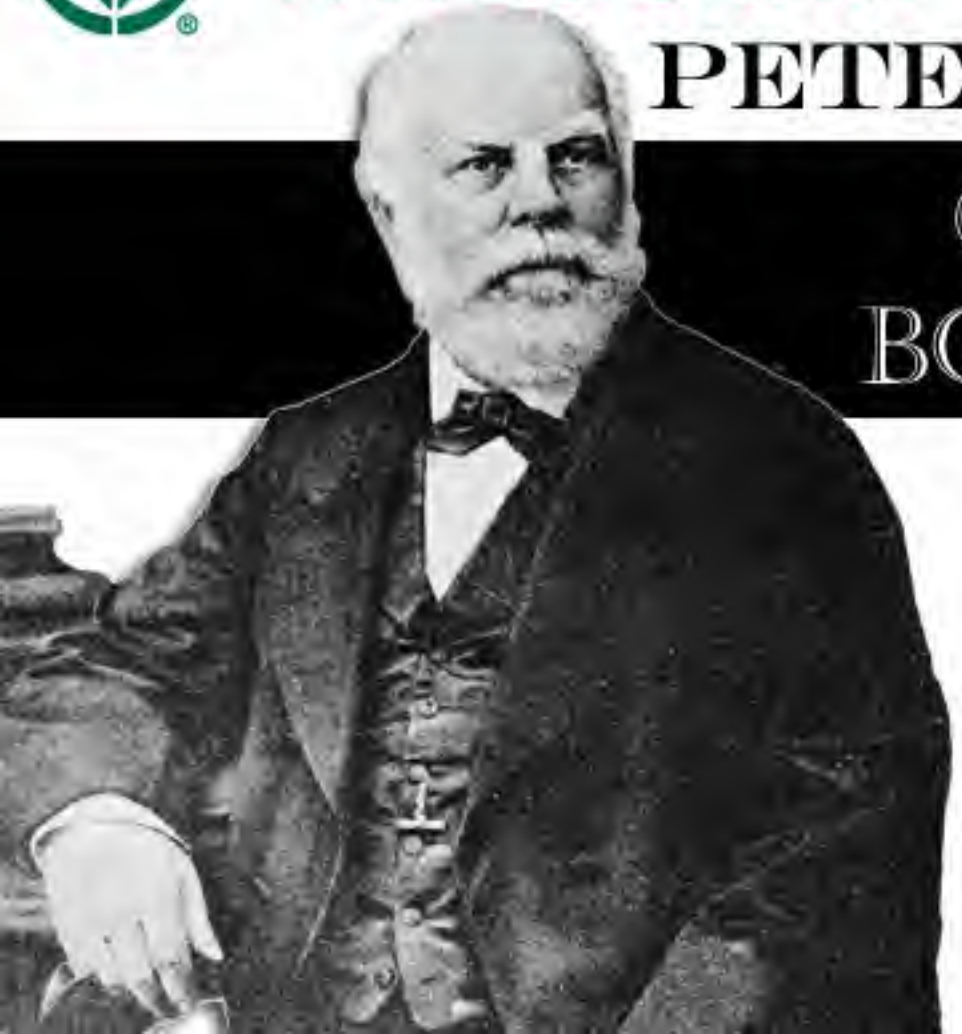
George Engelmann Botanical Notebooks



Pagination Note:
Since many of the items lack a specific page number, the page number displayed online refers to the sequentially created number each item was given upon cataloging the materials.

e[illegible] *g.*

Dimension[illegible]

The *Elæacr[illegible]s Kirkwooaensis* is n[illegible] allied to *E.* (*Pentremites*) *melo*, from which it is distinguished by its much smaller size and less deeply excavated base. It also occupies a higher geological position.

Occurs in the St. Louis Limestone (Carboniferous) on the Pacific railroad near Kirkwood, St. Louis county, Missouri.

Thos. Wyatt
5794-60 2

0 cm 1 2 3 4 5 6 7 8 9 10
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th
v exh 10
e min lat. ? 40', long. 113° 30 west of Greenwich, west of south of Salt Lake, in Thomas' range of mountains, on Capt. Simpson's return trail. Circumstances prevented me from obtaining more than a few crystals, which are now deposited in the collection of the Smithsonian Institute; a few others are also in the hands of members of the party. We were travelling at the time by forced night marches with nearly worn out animals, seeking to gain a spring of water in a distant range of mountains. This desert was then entirely unexplored. I have but little doubt that more interesting materials are to be found at the same point.

The mountains of the former Territory of Utah promise a rich yield to the mineralogist. We know already of gold and silver ores in the east, west and south part of that district; of copper and lead ores in the south, and I have discovered the latter also in the centre of it; of specular iron ores and native sulphur in the Rocky Mountains and near Little Salt Lake; of rock salt in the mountains south-east of Utah Lake; of native alum near Salt Lake; of various other salts in the deserts; and of silicates, composing the granites, porphyries, diorites, trachytes, and lavas, nearly over the whole area.

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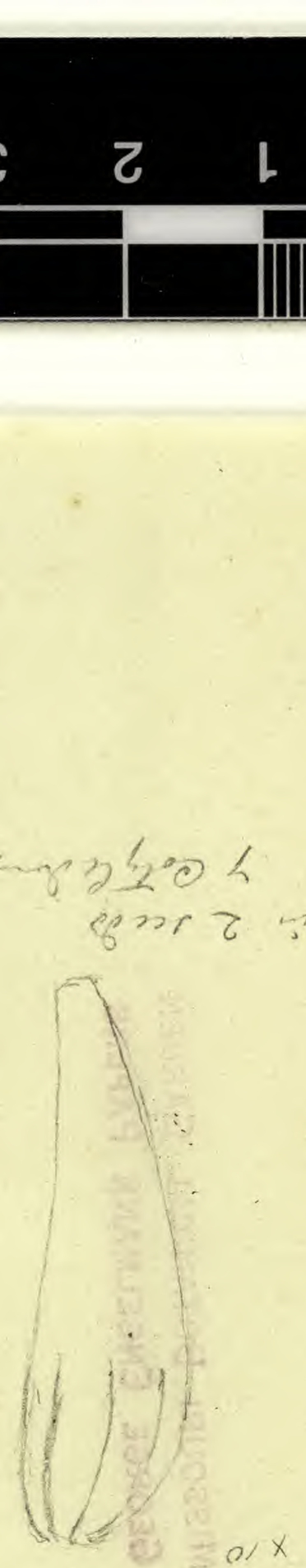

Planera Aquatica
Gmelin. Gatt.

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APOTHECARY & PHARMACEUTIST,

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Pines plunges Coll Germantown Pa by Meehan
sent living — Gut post flowering May 1865
examd May 14th
very little Pollen adhering to Anuets.
Axes of male inflorescence 6–9 lines long.
Anuets also 6–9 lines long, red.
Bracts linear subulate somewhat persisted, a little
longer than involucral scales, abt 2½ lines long.
Involucral scales 6, 7 or 8 apparently more frequently 8
2 external ones much smaller than the others
Anthers ovate, with red, nearly entire,
Pollen 0.040–0.049 lii = Longest diameter, usually abt 0.030

Leaves short stout, twisted, very finely serrulate, obtusish
and cuspidate with a cartilaginous point: abt 1¼ inch long
and 0.7–0.9 lines wide
3/4 line basis somewhat persistent through the second year —
Vagina at first 6 lines, second year 1–1½ lines long

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Pinus Benges
Germination
May 15 1865

x30

x150

x2

x30

x60

dorsal

Teeth not visible because dried to the ventral side

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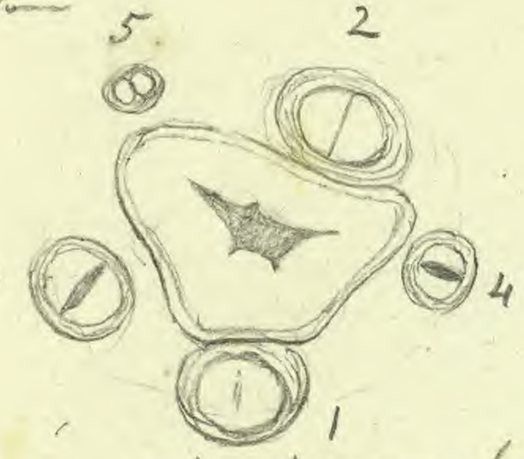
Pinus pungens ×4 May 14 1865

call. Meahan, Germanton Pa

examd living - but past flowering

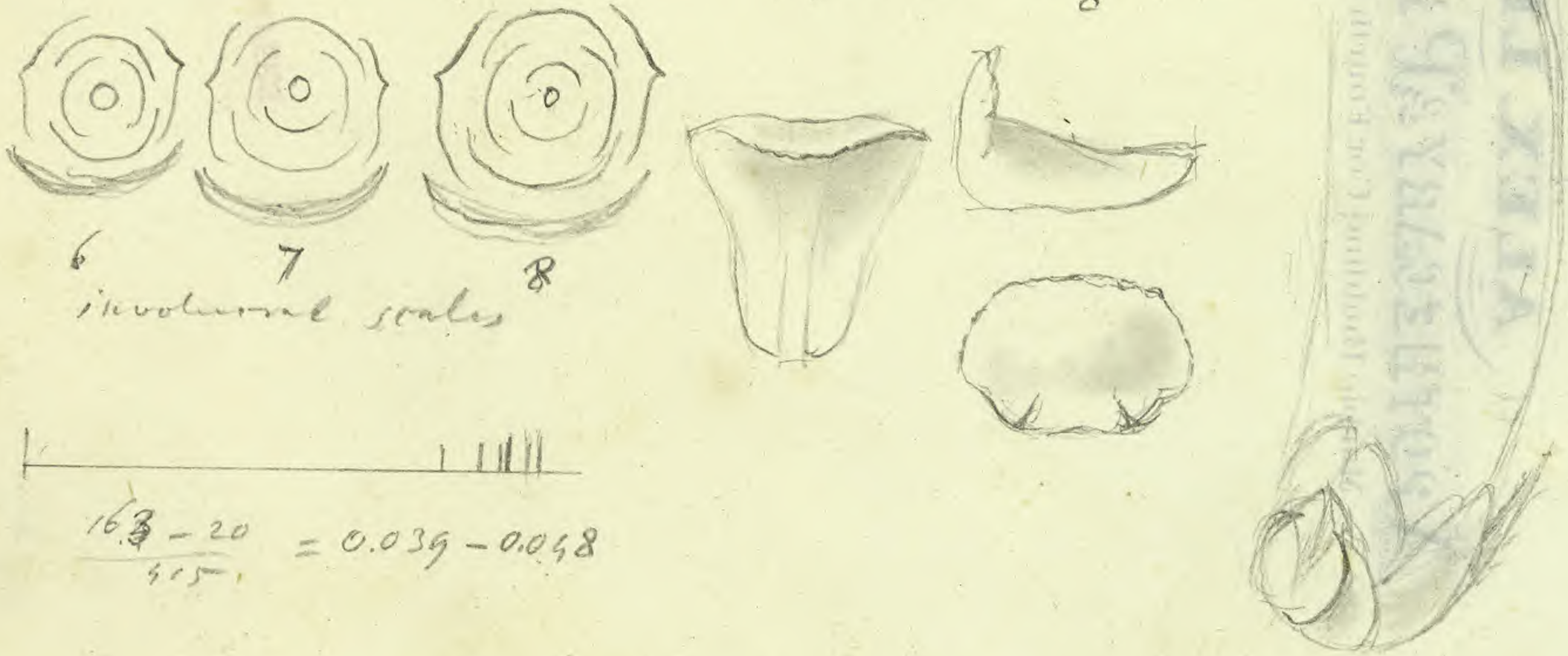
×280

Pollen $\frac{11.7-13}{280}$ = 0042 – 0.047 Cm



set of young shoot showing position of leaves; fascicles in $\frac{5}{8}$ arrangt

×4



involucral scales

$\frac{16.3-20}{505}$ = 0.039 – 0.048

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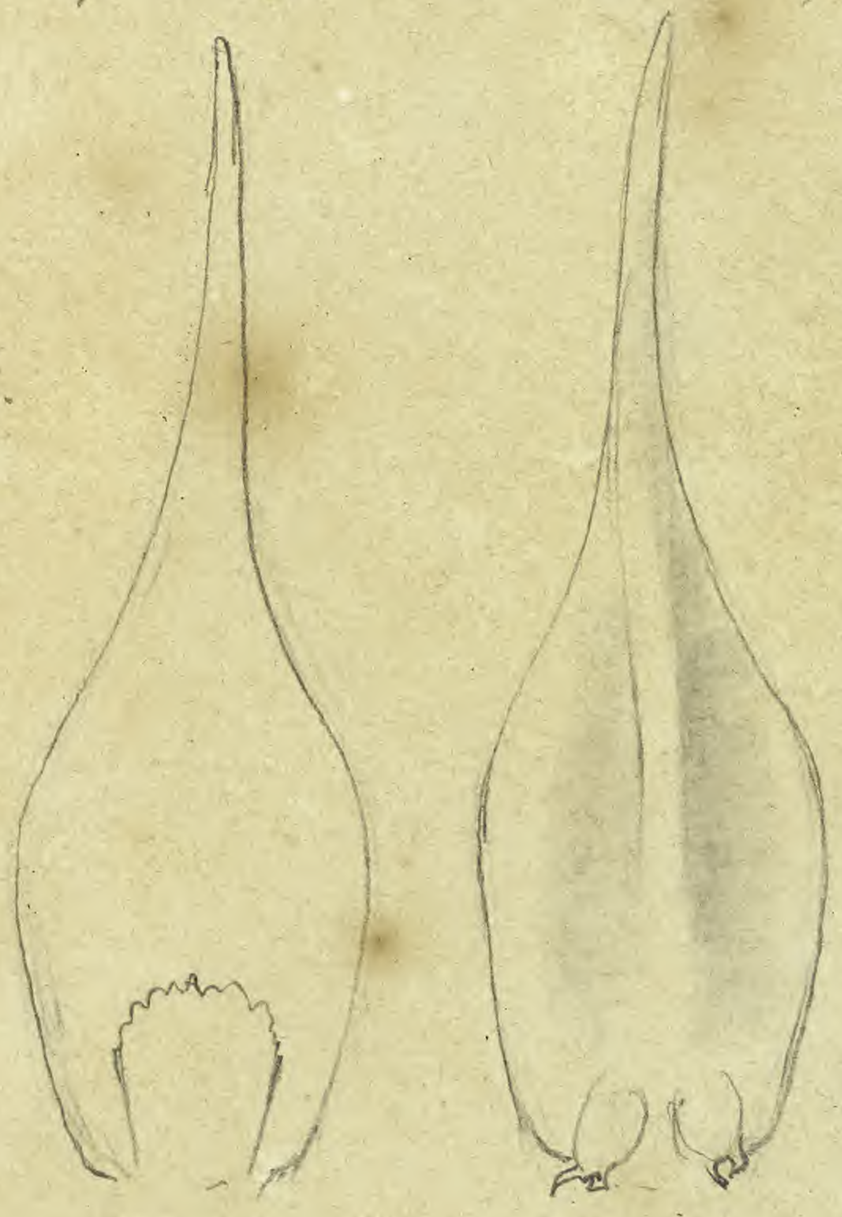
Pinus pungens

June 1st 1865

Fem. fl. Germantown Pa, Th. Meehan
del



outside

inside.

scale with its Bract ×10

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P. pungens

May 12 1878

Cesar's Head. N Carolina Sept 1 1876. JE

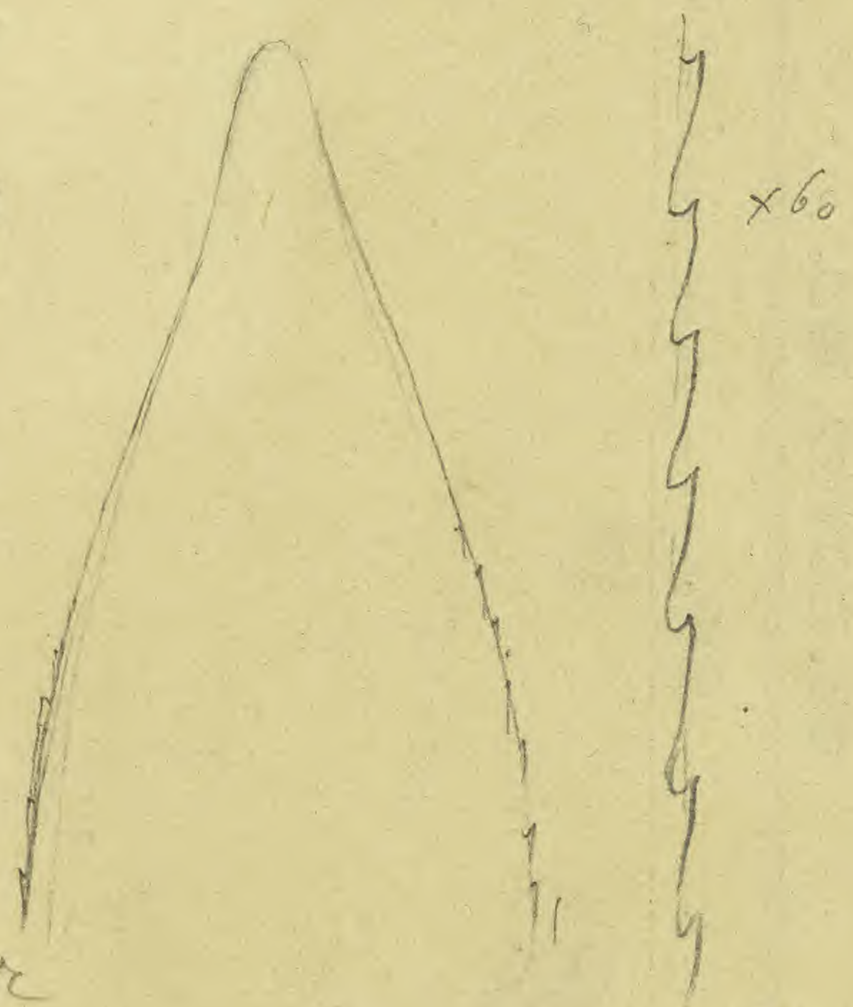
x 30 Leaf 1,9 mm wide

no hypoderm cells in the interior of leaf

on the edges sparingly, and under the epidermis in very small bundles ~~of~~ layers

Between the series of stomata say 2–6 to section — on upper side of none

Ducts parenchymatous, 2, rarely 3



x 60

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Henry T. Rohlfing,

APOTHECARY,

No. 2600 Laclede Ave., S. W. Cor. Jefferson Ave.,

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No. ..... *Date,* *187*

℞

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Geo. Engelmann, M. D.,
No. 3003 Locust Street.

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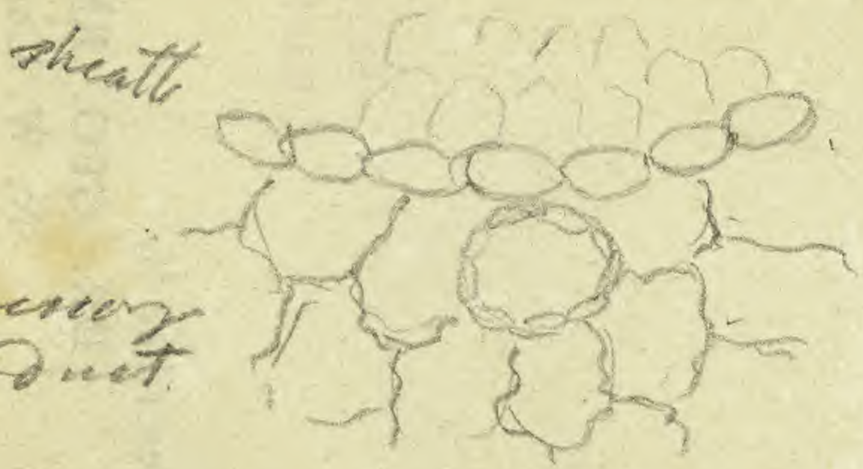
Pin punctures
Notes of Virginia Canby

May 15th 1878

x 60

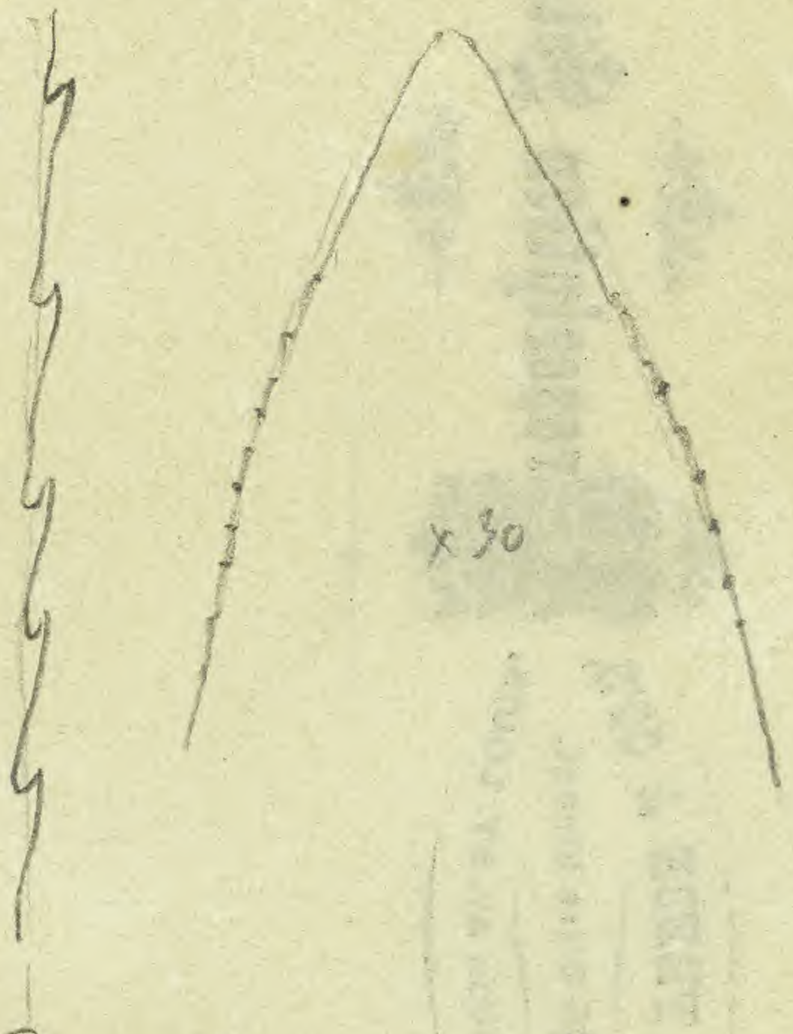
2 parenchymatous ducts with some accessory ones close to sheath



sheath

accessory duct

hypoderm very little & th corners and very little here and there under epidermis



x 30

Mc Min, Pennsylvania, is the same but only two lateral parenchymat. ducts

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May 15 1878

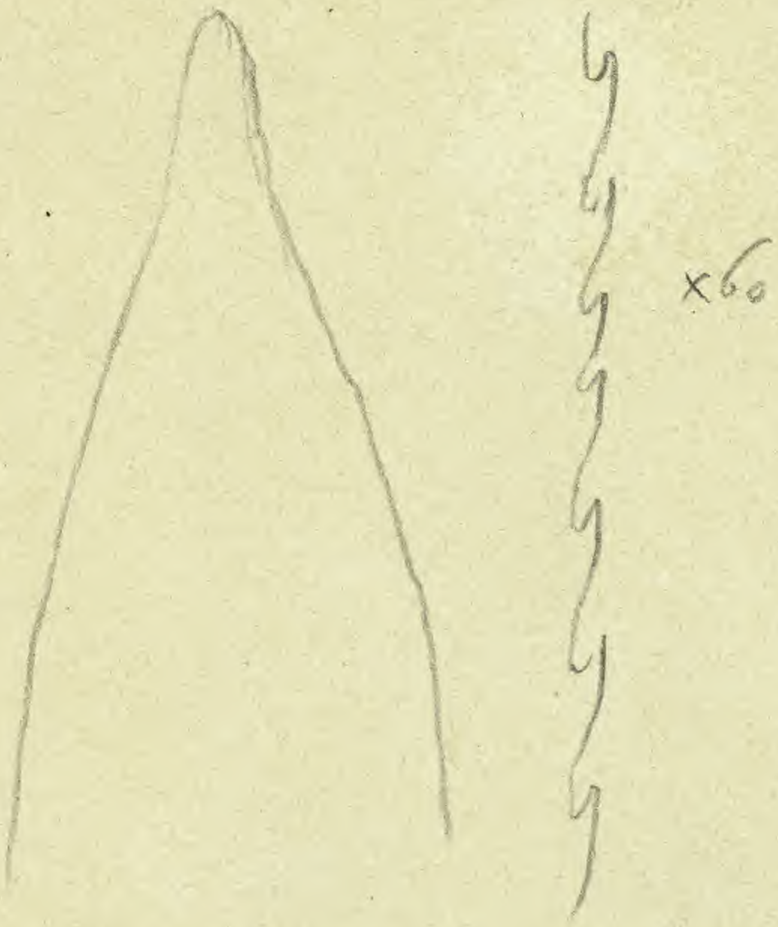
Pin pungens

Exp 1.6 mm wide

coll. Meehan, Germantown

×30

hypoderm on corners and slightly around, on opposite side a great deal more than on lower



×60

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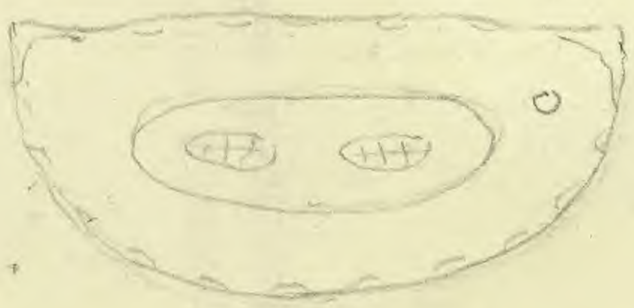
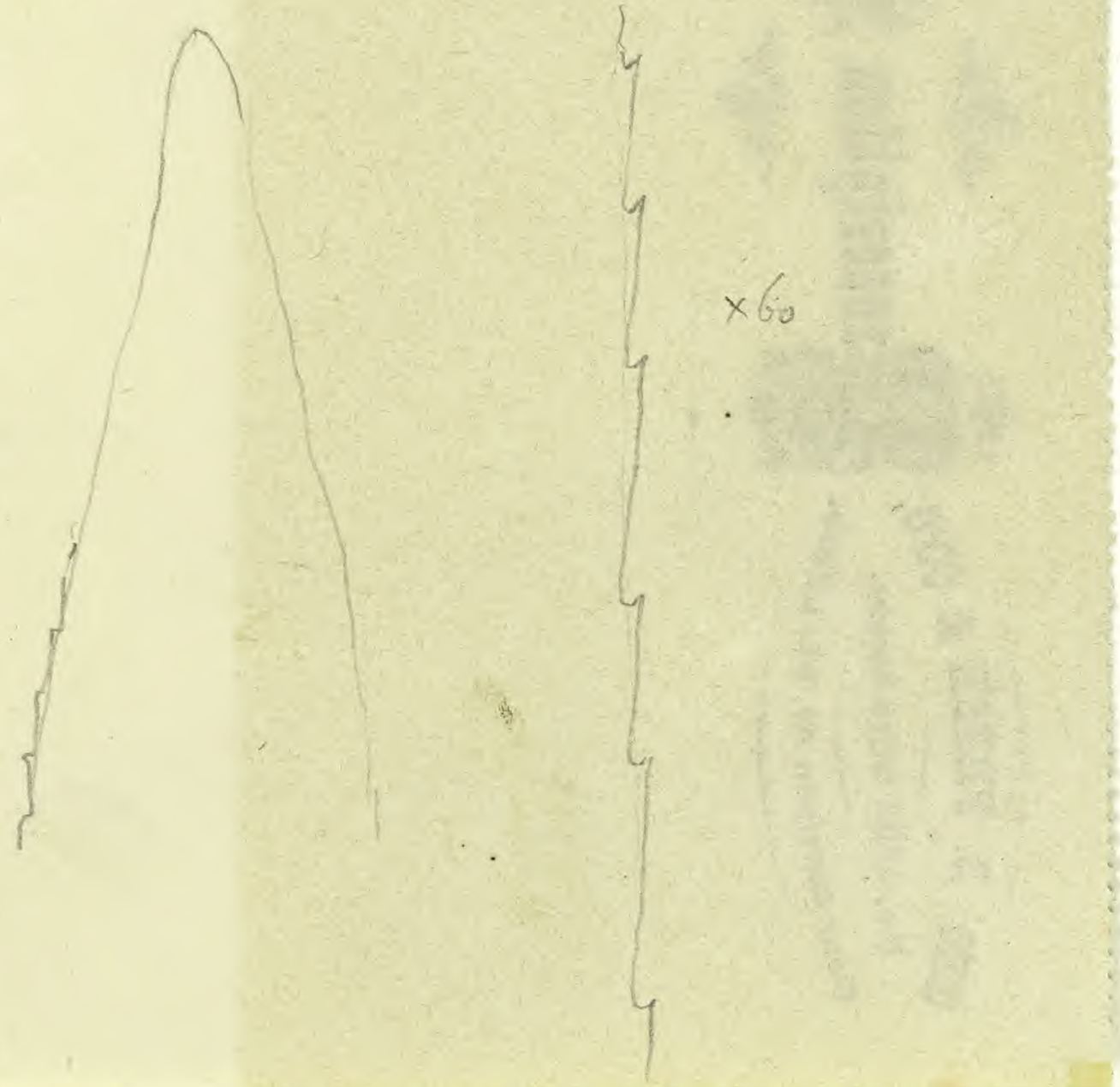
July 25 1878

P. pergamenus

sterile.

on small tree in Hudson Bay (fresh & Glycerin)





mostly only one sheet - without hypodermis.

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the entire voyage. A description will be given on application to the Secretary.

Any special instructions from parents or guardians will be strictly and faithfully followed by the management.

The expenses of the expedition are so great that it is impossible to further increase the number of paid instructors, but provision is made whereby students of mature years, ability, and proficiency in some special branch may be enabled to give instruction in that department.

WORSHIP.

As different religious views will no doubt be represented in the expedition, the public duty of the Chaplain will consist in reading prayers and such religious observances as are customary on our men of war.

LADY STUDENTS.

As many applications have been received from lady students desiring to join the expedition, it is in contemplation to organize a limited class of such applicants under such direction as appears proper and desirable. To ascertain how many such students may be expected, and whether the contemplated class be practicable, all lady applicants are requested to correspond with Miss Louisa M. Reed, of Michigan University, Ann Arbor, Michigan.

MEDICAL.

The medical department will be under the supervision of experienced physicians, who will give the best possible attention and most careful nursing in all cases of sickness.

ARMAMENT.

The vessel will be supplied with a full complement of breech-loading rifles and fixed ammunition for the purposes of military

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drill and hunting, and the only arms that can be needed or wil be allowed the students are shot guns or fowling pieces. It i recommended that these be breech-loading, central fire, calibe 12, of good manufacture, with at least one hundred metalli shells, and the usual cleaning and other necessary apparatus. Al arms and ammunition will be kept in the armory and the maga zine, under the control of the officers of the vessel.

MISCELLANEOUS.

RECOGNITION BY GOVERNMENT.

From official assurances it is believed that the expedition wi be recognized and approved by the National Government, thu insuring many important advantages which will be especiall valuable to such an enterprise. This recognition is due to th opinion that the scientific explorations made and informatic obtained, the surveys and soundings, the various and valuab observations, and the instructions given in navigation and se manship, may be of interest and importance to the country.

PHOTOGRAPHY.

An experienced photographer will accompany the expeditio with ample apparatus and material for photographing all des able views or objects. This addition will enable the student preserve vivid and complete pictures of all the most striki scenes of the tour, and furnish him altogether a full panorar of its course and incidents.

WAITERS.

A competent corps of attentive waiters will be obtained, a they will not be permitted to solicit or accept any fee or gratu whatever.

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pate all the chances of detention by weather, or by protracted explorations, so as to determine with precision all the details of reaching, remaining in and leaving every place included in the route, but it has been done as fully as practicable. The management gives its strongest assurance that no trouble or expense will be spared, and no effort on the part of the Director, the Trustees and the naval officers to carry out in good faith the letter and spirit of the scheme of voyage presented. The interests and objects of all are identical, and so should be the efforts of all. The voyage, as already announced, will require about two years, and as about two-thirds of the time may be spent in port, in excursions and explorations, it is thought that the stay at each place will be long enough to attain fully the objects of the expedition. It is estimated that the distance traveled will be about 50,000 miles.

RECEIPTS OF MAIL.

At Rio de Janeiro, November, 1877.
Valparaiso via Panama, February, 1878.
Feejee Islands via San Francisco, April, 1878.
Sidney, Australia, via San Francisco, May, 1878.
Yokohama via San Francisco, August, 1878.
Hong Kong via San Francisco, October, 1878.
Singapore via Brindisi, December, 1878.
Calcutta via Brindisi, February, 1879.
Alexandria via Brindisi, May, 1879.

And to all other places after leaving Alexandria, to care of B. F. Stevens, U. S. Dispatch Agent, 4 Trafalgar Square, Charing Cross, London.

New York City on arrival home.

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VESSEL AND EQUIPMENT.

For the purposes of this expedition the well-known screw steamship "City of Mérida," of Alexandre's New York, Havana and Mexican Mail S. S. Line, has been secured. She is 1,492 tons burthen, 256 feet long, 36 feet 9 inches wide, 26 feet deep, has three decks; from the spar, or upper, deck to main deck is 7 feet 6 inches; from main to lower deck 8 feet, and from lower deck to floor is 11 feet; is brig rigged, and in every respect a thoroughly first class steamship; was built in 1870. She is fitted with state rooms and saloons for work, study, lectures, and all other uses of a scientific and educational tour, and is provided with a steam launch, an adequate number of smaller boats, an ample armament, and is to be commanded by experienced and skillful naval officers, with a trained crew. A large library will be furnished, in which especial care will be taken to supply the members with the best works on science and travel, particularly those relating to the places embraced in the route, with a full and suitable provision of scientific apparatus for the illustration of the subjects of study, and the investigation of all natural products and phenomena that may be deemed desirable. Especial attention will be constantly given to the sanitary condition of the vessel, and the health, comfort and convenience of all on board.

As a well supplied table contributes materially not only to the health and enjoyment but to the efficiency of such an expedition, every care will be taken to secure good stewards, cooks and the best provisions attainable. To this end every opportunity will be used to procure fruits and fresh provisions, to recruit and refit, and to do whatever may be found necessary to keep the vessel and the expedition in the best possible condition. This care, with the recent improvements in canning and preserving fruits and meats, will secure an excellent diet. Several of the Faculty

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reins zur Beförderung des Gartenbaues, 1860, Nos. 1–52—1861, Nos. 1–6, Berlin, *from the Society;* Atti della Societa Ital. di Scienze Nat., Milano, Vol. II., Fasc. 2, 1860, *from the Society;* Atti dell I. R. Istituto Veneto, T. V., Ser. iii., Disp. 10—T. VI., Ser. iii., Disp. 1–3, 1860–1, *from the Society;* Visir-und Recheninstrumente von Ernst Sedlaczeh, Wien, 1856,—Rechenschieber, von E. Sedlaczeh, Wien, 1856,—Kompendium der ebenen und sfärischen Trigonometrie von E. Sedlaczeh, Wien, 1856, *from Mr. Senoner;* L'Ortolano, Giornale Popolare d'Orticultura, Trieste, Anno I. 1–12, III. 1–9, 1859–60,—Allocuzione da Prof. Adolfo Stopice, Trieste, 1860, *from the Society;* Fr. Ambrosii Flora Tiroliæ Australis, Vol. II., Pt. 4, *from the Author;* Verhandl. des Naturh. Vereins, Bonn, Jahrg. XVII., 1–2, 1860, *from the Society;* Sitzungsb. der K. K. Akad der Wissenschaften, Wien, Band XLII., No. 22–28, 1860, *from the Society;* Nachrichten von der Georg-Augusts-Univ. u. der K. Gesellsch. der Wissensch., Göttingen, 1860, No. 1–29, *from the Society;* Bull. de la Société Linnéenne de Normandie, Vol. V., 1859–60, Caen, 1861, *from the Society;* Mém. de l'Acad. Imperiale de Metz, Ann. XLI., 1859–60, *from the Academy;* Jahrbücher des Vereins für Naturk. in Nassau, XIV. Heft, Wiesbaden, 1859, *from the Society;* Dr. J. C. Ed. Hoser's Rückblicke, Prag, 1848, von Dr. Weitenweber,—Sitzungsb. der K. böhm. Gesellsch. der Wissenschaften, Prag, 1859, Juli–Dec.—1860, Jan.–Juni, *from the Society;* I. Bericht des Offenbacher Vereins für Naturk, 1860, *from the Society;* Würzburger Medicin. Zeitschrift, II. Band, 1–2 Heft, 1861, *from the Society;* Der Zoologische Garten, von Dr. D. F. Weinland, Jahrg. II., No. 1–6, 1860–61, *from the Editor;* XX. Bericht über das Museum Francisco-Carolinum, Linz, 1860, *from the Institution;* Monatsb. der K. Preuss. Akad. der Wissenschaften, 1860, Berlin,—General Register, 1836-58, Berlin 1860, *from the Academy;* Gelehrte Anzeigen, Vol. 49 & 50,—Sitzungsb. des K. bayer. Akad. des Wissenschaften, 1860, Heft 1–3, München,—Verzeichniss der Mitglieder, 1860,—Bedeutung der Sanskritstudien, von Dr. Wilh. Christ, 1860,—Denkrede auf. Alex. von Humboldt, von C. F. P. von Martius, 1860,—Grenzen und Grenzgebiete der physikalischen Forschung, von Dr. C. Harless, 1860, *from the Royal Academy;* Proc. Acad. Nat. Sciences, Phil[illegible] M[illegible] *the Academy;* [illegible] of the Trustees [illegible]ry Albany [illegible]rustees

Dr. Koch presented specimens of quartz and of the silicious conglomerate from Madison County mentioned in Dr. Hilgard's letter.

Dr. Engelmann stated that the mean temperature of July (77.°5) had been lower than the usual mean of that month, and that the fall of rain during the same month (2.04 inches) was about one-half less than usual.

Dr. Wislizenus stated that the mean of atmospheric electricity of July had been 3.5° less than that of the month previous, and that the amount had been gradually decreasing since winter.

August 19, 1861.

The President, Dr. ENGELMANN, in the chair.

Six members present.

A letter was read from A. F. Bandelier, Jr., Highland, Ill., Aug. 1, 1861, communicating meteorological observations at Highland.

The following donations to the library were received:

Bull. de la Société Géologique de France, Ser. ii., T. XVIII., Feuilles 13–14, 22–31, Paris, 1861, *from the Society;* Proc. Amer. Phil. Society, Philad., Vol. XVIII., No. 65, 1861, *from the Society;* Jour. Franklin Inst., Philad., Aug. 1861, *from the Institute;* Proc. Acad. Nat. Sciences, Philad., [illegible]e, 1861, *from th*[illegible] [illegible]imilian I. König von [illegible]ern [illegible] der [illegible]erstpostmeister [illegible] [illegible]rof. Dr. Jo[illegible] —

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B. glabra Jam. aments subterminal (Sept 1865
on one branch of the
Charleston spec. apparently below the upper most leaves?)
Ovate lanceolate, 1 line long, slightly persistent
in dried summer.
Young sheathes 3 - 3½ or even 4 l. long
old ones 1 - 2 lines
Leaves of Mississippi specimen 2¼ - 3 inches
aver. 2¾
— — Charleston sp. 2¼ - 3½ (aver. 3)
young shoots in Charleston specimen
very slender

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Pinus mitis

Nov 20 1863

Granit Quarry near Blockade

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Cones horizontal, seeds already shed

almost.
Coats persistent apparently as long as leaves, probably
both deciduous with spring of the 3d year — so that they
do not get older than 2 full years; Coats 2 l. long
yg sheaths 5=6 alcons 3 l. long
yg shoots, even now, November, pale glaucous

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Pinus nitis

	Leaves	Sheaths young	Sheaths old	male inflorescence length of axis	ament length	number of ovule scales	size of Pollen
Virgin Birch	3"		3"	¼"	½"	12-13	0.039-42
Missouri	3-3½	5"-6	3"'	¼	¾	9-10	34-35
"	3-5		3"'				
? Arkansas	3"-4	5"-6	2"'				

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the custodians of it and its outfit. They will also have exclusive

METHODS OF FORMING OZONE.

Ozone may be formed by the decomposition of water, or by any chemical reaction by which oxygen is liberated in the free state. Oxygen liberated by decomposing chlorate of potassium by heat, always contains a trace of ozone. Oxygen formed by acting on black oxide of manganese or peroxide of lead by sulphuric acid, always contains sensible quantities of ozone. A very ready way of forming ozone in small amount, but continuously, is by action of concentrated sulphuric acid on the permanganate. Such a mixture placed in a glass bottle and closed with a glass stopple, will evolve ozone for weeks and some times for months. Indeed, a bottle which I thus prepared more than a year ago, still evolves very sensibe quantities of ozone.

Ozone may be formed in large amount by electrifying air or common oxygen. It is by this process that ozone is usually made when required in large amount, or in very concentrated form.

Ozone is also formed in all the ordinary forms of oxidation. Thus every flame produces (and destroys) a large amount of ozone. Where there is oxidation without a very high temperature, which destroys ozone, this substance is produced in comparatively large amount. A very elegant form of producing ozone is to plunge a glass rod heated to 300° or 400° Fah. into a mixture of vapor of ether and air. This method was once supposed to be anomalous, but I find that it comes under the general law, for if the heated glass rod be plunged into the mixture in the dark, a beautiful greenish-blue lambent flame envelopes the rod, and if the temperature is too low to secure this result no ozone is formed.

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HISTORY OF OZONE.

It had long been observed that air surrounding a highly charged, prime conductor, had a peculiar odor, called the "electrical odor," the same that is perceived after a stroke of lightning. In 1785 Von Marum, of Holland, observed that oxygen gas through which eletrical sparks had been passed acquired a peculiar odor and the property of attacking mercury. The odor was attributed to particles of finely divided metallic oxide diffused through the gas. The subject received no further attention till 1840, when Schonbein, in a communication to the Academy of Munich, announced that in the voltaic decomposition of water, an odorous substance accompanied the oxygen evolved at the positive pole of the battery: that this odorous substance could be preserved for some time in well-closed vessels. Schonbein supposed it was a new elementary body, and on account of its peculiar odor gave it the name of ozone. He next supposed that ozone, combined with hydrogen, would form nitrogen. He next concluded it was a terxoide of hydrogen. In 1858 he finally concluded that ozone is negatively electrified oxygen, while [illegible]ified oxygen he called antozone. This antozone has since been [illegible] Schonbein also discovered

will be accompanied by their wives and daughters. Musical and other entertainments best calculated to vary and relieve the strain of study will form a prominent feature of life at sea and in port.

THE DIRECTOR.

The Director will have sole and exclusive control and management of the expedition as herein set forth.

TRUSTEES AND FINANCE.

For the guardianship and protection of the interests of the expedition and all engaged in it, five members of the Faculty, Prof. Burt G. Wilder, Commander John W. Philip, U. S. N., Prof. William J. Herdman, Gen. Daniel Macauley, and Prof. W. L. B. Jenney, will act as Trustees. They will examine the ship, her equipment, outfit, and supplies of all kinds, and determine the quality and quantity required for the voyage. They will be the judges, throughout the entire tour, of the proper and sufficient fulfillment of the conditions of the expedition, and will enforce the strictest practicable conformity to them. They will receive and hold, during the two years absence, and until the return to New York, the charter of the vessel, thus becoming the custodians of it and its outfit. They will also have exclusive possession and control of all the funds of the expedition, derived from the membership fees of students, as follows:

Booking Fee	$ 500
Payment August 1st, 1877	2,000
Payment September 15th, 1877	2,500
Total	$5,000

These funds will be held in trust by the Trustees, and disposed of by them in the manner following: After deducting $30,000 for an inland excursion fund, they will pay over to the Director,

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on his transfer to them for two years, of an accepted suitable steamship, one-fourth of the total of the students' membership fees, and when the vessel has been thoroughly fitted, equipped, and supplied for the voyage, according to the plan agreed upon and herein set forth, they will pay over to him another fourth of said membership fees. Each six months thereafter, the conditions of the expedition being carried out in good faith and to the satisfaction of the Trustees, they will pay over one-eighth of said fees. This arrangement will at all times leave in their hands a sum sufficient, with the vessel and her outfit, to complete the voyage.

Applicants will be booked, and entitled to the choice of staterooms in the order of application. Including the Faculty, officers, students, cadets, and crew, there will be about two hundred persons in the expedition.

THE FACULTY.

The Faculty, composed of men of established reputation as teachers and investigators in the various branches of science in their charge, will have entire direction and control of the educational work and the scientific examinations which the expedition is primarily intended to assist. Earnest and thorough work is intended, and the various unexplored countries that will be visited offer abundant opportunities for discoveries in geography and all the branches of natural history. The fund set aside for inland scientific excursions will be placed at the disposal of the Faculty, to be applied at such places and in such manner as will best further the objects of the expedition and the interests of its members.

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2-3 hours. Pretend. Just [illegible] of
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sible assistance will be given the students in making them, and in preserving and preparing them for shipment home.

Ammunition, and material for taxidermy and other means of preserving specimens, stationery and drawing materials, will be carried in stock, and furnished at cost. As the vessel will carry no cargo but its outfit, there will be abundant room for the storage of the largest collections of curiosities and specimens of natural history that can be made.

Any student sent from our Universities, or by others, for the purpose of making scientific collections, will receive special attention from the members of the faculty, in order that such collections may be of value, and a credit alike to the students and to the expedition.

It will always be optional with the students to accompany any of the excursions that may be organized, or remain with the vessel. When there are two or more excursions contemplated or in progress at the same time, each student may choose which, if any, he will take part in.

The amount of baggage allowed each student, in excess of what is usually kept in state-rooms, is 500 pounds, which will be securely kept in a room appropriated to that use, and accessible at stated times during the day.

Extra expenses need be very slight, if the student confine himself to those excursions the expenses of which are paid by the Director. These, as the plan of the route shows, are numerous and interesting, and alone will make him a traveler of greater experience and wider observation than many who have fairly earned renown as travelers. Opportunity, however, will be given, as already stated, to those who desire other and wider

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inland excursions, to make them, *at their own expense*, during the constantly recurring stoppages of the vessel in port. All facilities will be given to such excursions, and all assistance to make the expense as light as possible. For the purpose of instruction and discipline, such independent expeditions will be accompanied by one or more members of the faculty, at the expense of the director.

As all instruction is to be given by lectures and object-teaching, no text books will be required. There will, however, be, as before suggested, a library on board always open to the students, which will contain all the books necessary for research or reference. It is advised that in addition each student provide himself with the best works relating to the specialty he elects to pursue. A list of books recommended in each department will be supplied by the Secretary. Should students or others desire to lend to the library books of special or general interest, they are requested to send lists of them to the Secretary, that duplicates may be avoided and the space they would fill be more economically used. Such books will be properly cared for by a competent librarian, and at the close of the voyage returned to the owners.

A list of such clothing and other necessaries as may be required for the tour and its various exigencies, will be furnished on application to the Secretary. The outfit need not be larger nor more expensive than would be required at home during two years of ordinary life, and can be obtained at many of the ports visited as cheaply as at home. A list of instruments recommended for work in the various departments will be supplied by the Secretary.

A simple and inexpensive uniform or distinctive dress has been adopted, which the student will be required to wear throughout

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Dr. Koch presented specimens of quartz and of the silicious conglomerate from Madison County mentioned in Dr. Hilgard's letter.

Dr. Engelmann stated that the mean temperature of July (77.°5) had been lower than the usual mean of that month, and that the fall of rain during the same month (2.04 inches) was about one-half less than usual.

Dr. Wislizenus stated that the mean of atmospheric electricity of July had been 3.5° less than that of the month previous, and that the amount had been gradually decreasing since winter.

August 19, 1861.

The President, Dr. ENGELMANN, in the chair.

Six members present.

A letter was read from A. F. Bandelier, Jr., Highland, Ill., Aug. 1, 1861, communicating meteorological observations at Highland.

The following donations to the library were received:

Bull. de la Société Géologique de France, Ser. ii., T. XVIII., Feuilles 13–14, 22–31, Paris, 1861, *from the Society;* Proc. Amer. Phil. Society, Philad., Vol. XVIII., No. 65, 1861, *from the Society;* Jour. Franklin Inst., Philad., Aug. 1861, *from the Institute;* Proc. Acad. N[illegible]ences, Philad., J[illegible]ignac and [illegible] *Academy;* Maxim[illegible]ay [illegible] they called pole[illegible]'s. vor[illegible]on. [illegible]

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Pinus Banksiana

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